and is presented with considerable force and literary skill, and this circumstance makes its faults all the more regrettable. Besides that to which allusion has already been made there are two others, first the obtrusive egotism of the writer, and secondly his habit of misrepresenting people from whom he differs in opinion. To say that "for years the chief object of the biometrical laboratory at University College has seemed to be, and now clearly is, to prove the inheritance of this or that human character is 'not Mendelian'" is little short of libellous. Nor is it just to assert "Newton was a weakly baby, prematurely born, and would promptly have been condemned as not worth keeping had the statistical school been in power in his day."

Finally we should like to know what eugenists maintain that "a high birth-rate and a high infant mortality rate are to be commended because of their 'selection value,'" or that "slums are defensible on the ground that in the course of time there is bred in them a slum race which withstands and even thrives in such conditions."

A PRINCETON COLLOQUIUM ON MATHEMATICS.

The Princeton Colloquium: Lectures on Mathematics, delivered September 15 *to* 17, 1909, *before Members of the American Mathematical Society in connection with the Summer Meeting held at Princeton University, Princeton, N.J.* By G. A. Bliss and E. Kasner. Pp. iii + ii + 107 + ii + 117. (New York: American Mathematical Society, 1913.)

THE first of the courses contained in this volume deals mainly with the theory of a set of implicit functions y_i, defined by a set of equations, $f_i = 0$ ($i = 1, 2, \ldots n$), each involving the implicit functions and also the independent variables, $x_1, x_2, \ldots x_m$. In its general character the treatment is similar to that invented by Cauchy; but it is noticeable how the analysis has been simplified, and the results generalised, by improvements made quite recently. In particular, attention may be directed to the elementary character of the proof (by MacMillan) of what Prof. Bliss calls the preparation theorem of Weierstrass (p. 50): other illustrations might be given of a similar kind.

In carrying out the methods and ideas of Weierstrass, the principal result is that we obtain expansions for the y_i valid "in the neighbourhood of a point (a, b)." Prof. Bliss himself points out that one main object of his course is to deduce from the initial solution (a, b) something more than solutions of which we can merely say that they are valid very close to (a, b). By means of what he calls "a sheet of points" he is able to deduce from any initial solution (at an ordinary point) a sheet of solutions which only fail at "exceptional points," so we have something more or less analogous to Weierstrass's "analytical continuation" of a branch of a curve.

There are various interesting paragraphs on transformations from one plane region to another; a partial discussion of the singularities of the y_i, and a final lecture on existence-theorems connected with a set of differential equations.

Prof. Kasner's course on dynamics presents many features of novelty and interest. Broadly speaking, it is a quasi-geometrical study of trajectories with the aid of analytical (mainly contact) transformations. Many of the results obtained are of a remarkably elegant character: for instance, in the constrained motion of a particle on a surface under the action of positional forces, we have the theorem that the ∞^1 trajectories starting from a given lineal element have osculating spheres, at the common point, the centres of which lie on a conic in the plane normal to the element. A problem of more interest to physicists is this: given a system of curves in space, to find the condition that they may be trajectories, and to deduce the field of force from the set of curves when the proper condition is satisfied. This problem is fully discussed in chap. i., and the conditions for a conservative field are put into a remarkable geometric form.

We have also a section on least action, one on the space-time transformation used by Lorentz in the relativity theory, and various special illustrations of the general results.

Both these courses are so advanced that it is not easy to do them justice in a review: but from what has been said some idea may be gained of their general scope. Lectures of this kind are very valuable because they focus, so to speak, various lines of research upon a limited subject, and give an account of the really important results obtained.

G. B. M.

NATIONAL MUSEUMS AND SYSTEMATIC BIOLOGY.

(1) *Manual of the New Zealand Mollusca.* With an Atlas of Quarto Plates. By H. Suter. Pp. xxiii + 1120. (Wellington, N.Z.; J. Mackay, 1913.)

(2) *Catalogue of the Ungulate Mammals in the British Museum (Natural History).* Vol. ii., Artiodactyla, Family Bovidæ, Subfamilies Bubalinæ to Reduncinæ (Hartebeests, Gnus, Duikers, Dik-Diks, Klipspringers, Reedbucks, Waterbucks, etc.). By R. Lydekker, assisted by G. Blaine. Pp. xvi + 295. (London: British

Museum (Natural History); Longmans, Green and Co., 1914.) Price 7*s*. 6*d*.

(3) *A Revision of the Ichneumonidae based on the Collection in the British Museum (Natural History).* Part iii. Tribes Pimplides and Bassides. By C. Morley. Pp. xi + 148. (London: British Museum (Natural History); Longmans, Green and Co., 1914.) Price 5*s*. 6*d*.

(4) *British Museum (Natural History). A Monograph of the Genus Sabicea.* By H. F. Wernham. Pp. v + 82 + xii plates. (London: British Museum (Natural History); Longmans, Green and Co., 1914.) Price 6*s*.

(5) *Echinoderma of the Indian Museum.* Part viii., Echinoidea (1) "An Account of the Echinoidea." By Prof. R. Koehler. Pp. 258 + xx plates. (Calcutta: Indian Museum, 1914.) Price 20 rupees.

THE publication of these volumes justifies, we think, the view held by a large number of biologists, that one of the most important functions of a national museum is to act as a centre of research in systematic biology. These institutions alone possess collections sufficiently adequate in number of specimens and wide enough in scope for the successful accomplishment of such work, and besides collecting and storing such collections, it is clearly their duty to have them studied and classified.

Mr. Morley's work is a particularly forcible example of the importance of systematic biology, and of the responsibilities which rest on the nation of having such work done and published. At a time when the study of economic entomology is so much to the fore, and when it is more than ever established that the one successful method of controlling insect pests is by means of their natural parasites, a revision of the most important group of parasitic insects is doubly needed, for it is imperative that parasites should be correctly identified before remedial measures, based on their use as controlling agents, are introduced. We are glad to note that our National Museum is alive to its duties in this connection.

(1) We congratulate the New Zealand Government on its enterprise in publishing Mr. Suter's manual, and the author on the successful accomplishment of an enormous task. The extensive additions to our knowledge of the molluscan fauna of New Zealand during the last thirty years had rendered a re-issue of Hutton's manual of 1880 imperative. The latter work enumerated 447 valid species, whereas the present volume deals with 1079 species, besides 108 subspecies and varieties. Mr. Suter brings our knowledge of the mollusca of New Zealand right up to date, and by giving useful keys to the genera and species renders his work invaluable to students and specialists alike. His manual, moreover, possesses one advantage over Hutton's in that it is accompanied by a volume of plates. Mr. Suter does not, we think, correctly interpret the rules of priority in zoological nomenclature. The fact that a specific name is unaccompanied by a figure is not, in our opinion, sufficient excuse for the rejection of that name, provided the description is sufficiently clear for identification purposes. Otherwise Mr. Suter's work contains few serious errors or misprints, more especially as he had no opportunity of revising the later proof sheets. The name of the genus to which our common periwinkle belongs is, however, surely misspelt. The use of ten different qualities of paper in the production of this volume may have been unavoidable, but it does not enhance the appearance of the book.

(2) In this volume dealing with certain subfamilies of African antelopes, Mr. Lydekker continues his valuable catalogue of the Ungulata in the British Museum collections. The work is provided liberally with useful keys for the identification of families, genera, species and subspecies, and is accompanied by a number of useful photographs of heads and horns. We are very glad to notice that Mr. Lydekker has given special prominence to external characters, more particularly to the horns, for, besides rendering the work more readily acceptable to sportsmen, it is made of greater service to the museum curator who, more often than not, has only heads and horns at his disposal.

(3) We congratulate Mr. Morley on the rapid progress he is making with his important and much-needed revision of the Ichneumonidæ. This part follows the same general lines as the two preceding, and introduces nearly fifty species as new to science. Valuable as Mr. Morley's work is, it is as yet merely a collection of critical notes on species which the author has had the opportunity of examining. We think that such work would be more fittingly published in the Transactions of some learned society, or in some other serial publication, and this leads us to suggest that the British Museum authorities should consider the advisability of issuing a serial journal of their own for the publication of research such as Mr. Morley's, reserving their book publications for complete monographs, of the nature of those which are usually associated with their name. There is an abundance of work done under the auspices of the British Museum to justify such a periodical, and to keep it going. We hope that Mr. Morley's revision is but the necessary prelude to a fuller monograph.

(4) This monograph is based on a close examination of all the material of the genus contained in the principal European Herbaria, and the exhaustive nature of Mr. Wernham's work may be judged from the fact that he adds no fewer than sixty-two new species to the forty-four already known. All the species are briefly but concisely described, and there is an extremely useful key for their ready determination. The monograph, which is illustrated by twelve carefully lithographed plates, will be indispensable to all students of the Rubiaceæ and to curators of Herbaria who desire to have their material correctly labelled.

(5) In this memoir Prof. Koehler continues his valuable studies on the Echinodermata in the collections of the Indian Museum, and publishes the results of his examination of the Irregular Echinoids of the Spatangus group. Two genera and seventeen species are described as new to science. Several of the species had been given provisional new names by Anderson, and though they were unaccompanied by any kind of description, Prof. Koehler has, with characteristic courtesy, retained Anderson's names in all cases. The descriptions appear very clear and detailed, and are throughout accompanied by a wealth of illustrations. The work maintains the high standard set by Prof. Koehler in the six earlier memoirs in this series, of which he is the sole or part author. W. M. T.

OUR BOOKSHELF.

A Manual for Masons, Bricklayers, Concrete Workers and Plasterers. By Prof. J. A. van der Kloes. Revised and adapted to the requirements of British and American readers by Alfred B. Searle. Pp. xii + 235. (London: J. and A. Churchill, 1914.) Price 8*s.* 6*d.* net.

IN this book will be found much useful information regarding the composition of various kinds of mortar, together with the effects of mortar of unsuitable composition. These subjects occupy practically the whole volume. The book opens with some physical and chemical principles, among which we note that the scaling of stone, brick and concrete structures is ascribed to osmotic pressure caused by the expansion of material in the pores. A valuable feature of the book is the number of photographs included showing defects in existing continental structures—similar defects may be found in many British buildings.

In the section dealing with dams it is pointed out that engineers generally have confined themselves to the results of tensile and crushing tests of the mortar employed, notwithstanding the fact that a mortar strong under test may become the cause of disintegration of the structure in consequence of its bad composition. Many of the dams built in the last half-century will be found to be leaking if they are examined carefully. The author gives photographs showing the defects in the Gileppe dam, near Verviers, in Belgium, and quotes it as the worst example known to him. This dam was built in 1870–75 and has a height of 157 ft.; the thickness at the base is about 220 ft. and the breadth at the top is 50 ft. Sandstone and limestone from neighbouring quarries were used and the mortar was composed of five measures of hydraulic lime from Tournai, one measure of trass and four measures of sand, so that four to five times too much lime was used. The leakage at first amounted to 5570 gallons a day, and after four years the outside of the dam remained permanently wet. In May, 1911, the upper part of the dam showed dry incrustations, lower down the masonry was wet under the incrustations, and at the lowest part of the steps the dripping water was like a small waterfall.

We have probably quoted enough from the book to indicate the value of its contents to the engineer, architect, builder, and student; it is, however, a matter of regret from the student's point of view that the price of this useful volume has been fixed rather high.

The History and Economics of Indian Famines. By A. Loveday. Pp. x + 163. (London: G. Bell and Sons, Ltd, 1914.) Price 2*s.* 6*d.* net.

THE literature of Indian famines is so extensive that Mr. Loveday has had no light task in compiling the main historical facts and formulating the conclusions contained in this enlarged prize essay. Famines are rightly regarded as natural calamities, caused by failures or irregularities of the monsoons. Indian historians record their occurrence under native rule. The policy of the native rulers was rather prevention (by wrong methods) than cure: the mortality was fearful. Under the East India Company the famine policy was uncertain and unsuccessful, the systems of famine-relief were inadequate, the economic conditions different from the present. After 1858 the Government adopted, in the great famine of 1860 in Upper India, a famine relief organisation which has been greatly developed but never abandoned. The Orissa failure, 1866–7; the excessive expenditure accompanying the success in Bengal, 1874; the great mortality in Madras, 1877, led to the Famine Commission of 1878–80. Since then Famine Codes have been framed for famine-relief administration. With subsequent experience, mistakes have been corrected and the Codes perfected, so that now famines—of work rather than of food—are managed effectively. Mr. Loveday describes briefly the various stages of policy, *e.g.* importation, emigration, poor houses, etc., etc.; the later tendency has been to greater generosity and decentralisation. Irrigation works (when possible) to grow food are being extended; and railways to transport it to distressed tracts. Meanwhile the economic condition of India is varying, changes must be recognised, protective measures and the wider economic problems—indebtedness, agriculture, cooperative societies, etc., etc.—must be considered together. B.